

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q79636

Toshiaki AONO, et al.

Appln. No.: 10/765,929

Group Art Unit: 2853

Confirmation No.: 2659

Examiner: Laura E. MARTIN

Filed: January 29, 2004

For: INK-JET RECORDING INK AND IMAGE-FORMING METHOD

RESPONSE UNDER 37 C.F.R. § 1.111

MAIL STOP AMENDMENT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated February 1, 2007, please consider the remarks as submitted herewith on the accompanying pages.

REMARKS

Claims 1-34 are all the claims pending in the application. No amendment has been made.

Applicants noted and understood that previous rejections under 35 U.S.C. § 112 and 103(a) as well as obviousness-type double patenting rejection, set forth in Office Action mailed December 27, 2005, are withdrawn from the fact that the February 1, 2007 Office Action does not restate or retain the previous rejections and is made as a non-final with new rejections based on new combinations of references.

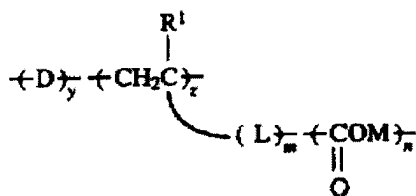
Rejection of Claims 1, 2, 5, 9, 23 and 24 under 35 U.S.C. § 103(a)

Claims 1, 2, 5, 9, 23 and 24 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara (US 5,753,422, “Shibahara”) in view of Ishizuka et al. (JP 2001-181548, “Ishizuka ’548”). Applicants respectfully traverse.

The Office Action asserts that Shibahara teaches a compound of formula (I): $R-X-(Y)_n-H$, wherein R is a hydrophobic group and $(Y)_n$ is a structural repeat unit comprising at least one structural unit represented by A, B, C or D, as recited in Claim 1. However, contrary to the Office Action’s assertion, Shibahara does not teach the compound of formula (I) as recited in Claim 1 of the present application.

Claim 1 of the present application relates to an aqueous ink composition comprising (a) colored fine particles including (a-1) an oil-soluble dye and (a-2) an oil-soluble polymer and (b) a compound of the general formula (I): $R-X-(Y)_n-H$, in which R is a hydrophobic group or a hydrophobic polymer, X represents a divalent linking group having a hetero-bond, for example, thioether, Y represents a group including at least one structural units A, B, C, and D, and n is a number of 10-3,500. The compound of the general formula (I) is a water-soluble polymer which has a hydrophobic group at its terminal. *See* page 98, lines 1-9 of the specification. Thus, the aqueous ink of Claim 1 of the present application contains an oil-soluble dye, dispersed as oil droplets having a small particle diameter, and a water-soluble polymer. The aqueous ink has excellent dispersion stability and storability over a prolonged period.

Shibahara discloses a silver halide color photographic material which comprises an anionic water-soluble polymer of formula (1):



In the formula, D represents a repeating unit of an ethylenically unsaturated monomer, y is from 0 to 95, z is from 5 to 100 ($y+z = 100$), R^1 represents a hydrogen atom, L is a divalent to tetravalent linking group, M represents a hydrogen atom or a cation, m represents 0 or 1, and n represents 1, 2 or 3. The silver halide color photographic material may comprise a dispersion of alkali-soluble polymer of formula (2) or a dispersion of polymer of formula (3), as shown in columns 2-3. None of Shibahara's polymers (1)-(3) have a divalent linking group having a hetero-bond and, therefore, Shibahara does not teach the compound of formula (I).

For at least this reason, Applicants believe that the rejection under 35 U.S.C. § 103 relying upon Shibahara as a primary reference is not sustainable.

Moreover, as the Office Action correctly points out, Shibahara does not teach an ink jet ink composition comprising colored fine particles including an oil-soluble dye and an oil-soluble polymer. The Office Action relies upon Ishizuka '548 to reject the claims.

Ishizuka '548 is relied upon to teach colored fine particles including an oil-soluble dye and an oil-soluble polymer, wherein the oil soluble polymer has a dissociable group. It appears that the Office's position is that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Shibahara with the disclosure of Ishizuka '548 in order to create a more stable ink for printing.

However, contrary to the Office Action's position, Ishizuka '548 does not teach or suggest that oil-soluble dye and an oil-soluble polymer may be used together with the polymers (1)-(3) as taught by Shibahara. Nor does it provide motivation to replace the polymers (1)-(3) taught by Shibahara with the compound of the formula (I) as recited in Claim 1. Ishizuka neither disclose or teach that the stability of inks is improved by adding a water soluble polymer.

Furthermore, Shibahara is related to a silver halide color photographic material. The polymer in photosensitive silver halide materials taught by Shibahara exists in the photosensitive material layers and the polymer is used to improve penetration of a developer into the photosensitive material layers during development.

Unlike the silver halide color photographic material taught by Shibahara, the presently claimed invention of the application shows excellent effects, by containing the polymer in inks for ink-jet recording, of good stability of the dispersed particles and good preservation stability over a prolonged period of time. Furthermore, when such inks are used for ink-jet recording purposes, clogging of a nozzle does not occur. Applicants respectfully submit that the technical field and problem/effects of teachings of Shibahara (i.e., photosensitive silver halide materials) are completely different from those of the present invention.

For at least the reasons discussed above, it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 3, 4, 10-19, 21 and 22 under 35 U.S.C. § 103(a)

Claims 3, 4, 10-19, 21 and 22 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara and Ishizuka '548, and further in view of Kubodera (JP 10-095942, "Kubodera"). Applicants respectfully traverse the rejection for the following reasons.

Shibahara and Ishizuka '548 are discussed above.

Kubodera is relied upon to teach that a hydrophobic group represented by R in general formula (I) is an aliphatic group or an aromatic group, alicyclic group. Kubodera is further relied upon to teach that the structural unit A is a structural unit derived from vinyl alcohol, alpha-methylvinyl alcohol or alpha-propylvinyl alcohol; the structural unit B is a structural unit derived from vinyl acetate, vinyl formate, vinyl propionate; and the structural unit C is a structural unit derived from acrylic acid, methacrylic acid, itaconic acid, maleic acid, an ammonium salt or a metal salt.

The Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosures of Shibahara with that of Kubodera in order to provide a more stable ink.

As discussed above, the Office Action has failed to establish prima facie case of obviousness based on Shibahara, Ishizuka '548 and Kubodera, as Shibahara fails to teach any elements recited in Claim 1, from which Claims 3, 4, 10-19, 21 and 22 directly or indirectly depend. As discussed above, Ishizuka '548 does not cure the defect or the combination of Shibahara and Ishizuka '548 does not teach all of the elements of Claims 3, 4, 10-19, 21 or 22.

Kubodera discloses an aqueous ink containing a water-soluble dye and a compound of formula (I) (“a water-soluble polymer”). Kubodera teaches that its ink has good spreading performance on a recording paper and free from the occurrence of ejection failure and irregular scattering (*see* the Abstract).

As discussed above, Claim 1 of the present application relates to an aqueous ink composition comprising (a) colored fine particles including (a-1) an oil-soluble dye and (a-2) an oil-soluble polymer and (b) a compound of the general formula (I): $R-X-(Y)_n-H$, in which R is a hydrophobic group or a hydrophobic polymer, X represents a divalent linking group having a hetero-bond, for example, thioether, Y represents a group including at least one structural units A, B, C, and D, and n is a number of 10-3,500. The compound of the general formula (I) is a water-soluble polymer which has a hydrophobic group at its terminal. *See* page 98, lines 1-9 of the specification. Thus, the aqueous ink of Claim 1 of the present application contains an oil-soluble dye, dispersed as oil droplets having a small particle diameter, and a water-soluble polymer. The aqueous ink has excellent dispersion stability and storability over a prolonged period.

Therefore, as the Office Action has acknowledged, the present invention is different from Kubodera’s invention in that the present invention contains an oil-soluble dye, while Kubodera’s invention contains a water-soluble dye.

Such difference is due to the different objects relating to the inclusion of the water-soluble polymer in the ink. In the present invention, the hydrophobic group at the terminal of the water-soluble polymer “can effectively prevent aggregation of the organic (oil) phase emulsified

and dispersed in an aqueous medium” (page 98, lines 4-5 of the specification) and can “maintain the ink in a uniformly dispersed state” (page 98, line 9 of the specification).

In contrast, Kubodera describes that the hydrophobic group of the aqueous polymer “enhances the dispersion stability of the water-soluble dye more effectively when R of Formula (I) is a hydrophobic group such as an alicyclic group or an aromatic hydrocarbon group, or a hydrophobic polymer, by means of higher mutual solubility with the water-soluble dye” (page 7, paragraph [0031] of the specification). Kubodera discloses only non-dispersed (homogeneous) inks and, in the first place, there is no problem of the stability of the dispersed particles.

Although the present invention and Kubodera’s invention contain the compound of formula (I) in common, the present invention was accomplished with a different background and motivation from Kubodera. The Office Action’s assertion that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ink taught by Shibahara as modified with the disclosure of Kubodera in order to provide a more stable ink lacks merit because the primary reference Shibahara does not teach any elements of Claim 1 of the present application nor provide any motivation to combine it with Kubodera. Furthermore, even if the two references are combined, it does not produce the currently claimed invention.

Ishizuka ‘548 is relied upon to disclose colored fine particles including an oil-soluble dye and an oil-soluble polymer. But, it does not suggest that oil-soluble dye and an oil-soluble polymer may be used together with the compound (I) as taught by Kubodera. Nor does Kubodera teach or suggest that the compound (I) can be used with an oil-soluble dye and an oil-soluble polymer, instead of a water-soluble dye. Moreover, as discussed above, the primary

Response under 37 C.F.R. § 1.111
USSN 10/765,929

reference Shibahara does not teach any of elements in Claim 1 and the combination of Shibahara, Kudodera and Ishizuka '548 does not cure the defect. Also, none of the references, single or in combinations, teach all of the elements of Claims 3, 4, 10-19, 21 or 22.

Therefore, it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 6 and 7 under 35 U.S.C. § 103(a)

Claims 6 and 7 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara and Ishizuka '548, and further in view of Yabuki et al. (US 20020067399, "Yabuki"). Applicants respectfully traverse the rejection.

Shibahara and Ishizuka '548 are relied upon to teach the ink of claim 1 while Yabuki is relied upon to teach the ink wherein the oil soluble dye is contained in an amount of 0.5-50% by mass based on a total mass of the ink or wherein the oil-soluble polymer is contained in an amount of 10-500% by mass based on a mass of the oil soluble dye.

The Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Shibahara with those of Ishizuka '548 or Yabuki in order to create a more stable ink composition.

As discussed above, the Office Action has failed to establish prima facie case of obviousness based on Shibahara, Ishizuka '548 and Yabuki, as Shibahara fails to teach any element recited in Claim 1 of the present application, from which Claims 6 and 7 depend from.

For at least this reason, the rejection is not sustainable.

Yabuki discloses an ink composition comprising an oil-soluble dye aggregate dispersed in a water-based medium. It is disclosed that a certain type of oil-soluble dye is used for this

purpose. However, Yabuki does not provide any teachings or disclosures of a desirability of replacing the water-soluble dye of Kubodera with the colored fine particles of Ishizuka '548 or the oil-soluble dye aggregate of Yabuki. The Office Action did not provide a reason why it would have been desirable to combine these references to attain the present invention, and has failed to identify any motivation to combine these references.

The ink of the present invention has evidently achieved the greater part of its performance by the water-soluble polymer (i.e., the compound of formula (I)). *See* Tables 3 and 4 on pages 129-13 of the specification. None of Shibahara, Ishizuka '548 or Yabuki describes that the inks include a water-soluble polymer, which is the key element of the present invention.

Therefore, applicants respectfully request that the rejection be withdrawn.

Rejection of Claim 8 under 35 U.S.C. § 103(a)

Claim 8 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara and Ishizuka '548, and further in view of Ishizuka et al. (US 20020088294, "Ishizuka '294").

Shibahara and Ishizuka '548 are relied upon to teach the ink of claim 1 while Ishizuka '294 is relied upon to teach the compound represented by formula (I) contained in amount of 1 to 50% by mass based on a mass of colored fine particles. Ishizuka '294 is further relied upon to disclose an ink composition comprising an oil-soluble dye and a vinyl polymer, in which the vinyl polymer is formed from a certain monomer having a cyano group.

The Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Shibahara with those of Ishizuka '294 in order to create a more stable ink composition.

As discussed above, the Office Action has failed to establish prima facie case of obviousness based on Shibahara, Ishizuka '548 and Ishizuka '294, as the primary reference, Shibahara fails to teach any element recited in Claim 1 of the present application, from which Claim 8 depends.

For at least this reason, the rejection is not sustainable.

Furthermore, none of other references, single or in combinations, teach all of the elements of Claims 1 or 8.

Accordingly, it is respectfully requested that the rejection be withdrawn.

Rejection of Claim 20 under 35 U.S.C. § 103(a)

Claim 20 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara and Ishizuka '548, and further in view of Leppard et al. (US 6,048,660, "Leppard").

Shibahara and Ishizuka '548 are relied upon to teach the ink of claim 1 while Leppard is relied upon to teach the structural unit D.

The Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ink taught by Shibahara with the disclosure of Leppard in order to provide for a stable ink composition.

As discussed above, the Office Action has failed to establish prima facie case of obviousness of Claim 1 based on Shibahara, Ishizuka '548 and Leppard, as Shibahara, the primary reference, fails to teach any elements recited in independent Claim 1 of the present application, from which Claim 20 depends.

For at least this reason, the rejection is not sustainable. Furthermore, none of the references, single or in combinations, teach all of the elements of Claim 20.

Accordingly, it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 25, 27, 29 and 34 under 35 U.S.C. § 103(a)

Claims 25, 27, 29 and 34 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara in view of Ito et al. (US 6,509,125, "Ito").

Shibahara is relied upon to teach the ink of claim 25 while Ito is relied upon to teach colored fine particles including an oil-soluble dye and a photopolymerizable monomer.

The Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Shibahara with the disclosure of Ito in order to provide for a stable ink composition.

As discussed above, the Office Action has failed to establish prima facie case of obviousness of Claim 25 based on Shibahara and Ito, as Shibahara, the primary reference, fails to teach any elements recited in Claim 25 of the present application.

For at least this reason, the rejection is not sustainable. Furthermore, none of the references, single or in combinations, teach all of the elements of Claims 25, 27, 29 or 34.

Accordingly, it is respectfully requested that the rejection be withdrawn.

In detail, Ito is related to a color filter and a liquid crystal display device having the color filter. The color filter has layers of a dye bound to a polymer. Ito arguably is not a proper § 103 reference because its technical field is not analogous to the present invention. In this regard, Applicants submit that Ito teaches away from an ink jet method at Column 1, lines 35-45, particularly lines 44-45. Furthermore, Ito does not teach a compound of the formula (I).

Accordingly, it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 28 under 35 U.S.C. § 103(a)

Claim 28 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara and Ito, and further in view of Kubodera.

Shibahara is relied upon to teach the ink of Claim 25 while Kubodera is relied upon to teach that R is a group derived from at least one hydrophobic polymer selected from the group consisting of polystyrene, polymethacrylic acid ester, polyacrylic acid ester, polyvinyl chloride, and derivatives thereof.

The Office Action states that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Shibahara with the disclosure of Kubodera in order to provide for a stable ink composition.

Shibahara and Kubodera are discussed above. As discussed above, the Office Action has failed to establish prima facie case of obviousness of the claims based on Shibahara and Kubodera, as Shibahara, the primary reference, fails to teach any elements recited in Claim 25 of the present application, from which Claim 28 depends.

Moreover, as the Office Action acknowledged in the Office Actions, neither of Shibahara or Kubodera teaches a colored fine particles including an oil-soluble dye and an oil-soluble polymer. See page 3, first full paragraph of February 1, 2007 Office Action & page 4, lines 12-20 of December 27, 2005 Office Action.

Accordingly, it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 26 and 33 under 35 U.S.C. § 103(a)

Claims 26 and 33 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara and Ito, and further in view of Ishizuka '548.

As discussed above, the Office Action has failed to establish prima facie case of obviousness of the claims based on Shibahara, Ito and Ishizuka '548, as Shibahara, the primary reference, fails to teach any elements recited in Claim 25 of the present application, from which Claims 26 and 33 depend.

For at least this reason, the rejection is not sustainable. Furthermore, none of the references, single or in combinations, teach all of the elements of Claims 26 or 33.

In more detail, Ishizuka '548 discloses that colored fine particles are prepared by adding to an aqueous phase an organic phase including an oil-soluble dye, emulsifying and dispersing a resultant mixture.

Ito is directed to a color filter and a liquid crystal display device having the color filter. The color filter has layers of a dye bound to a polymer. Applicants submit that Ito is not a proper section 103 reference because its technical field is not an analogous to the present invention. *See In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992); MPEP 2141.01(a).

Furthermore, it appears that Ito teaches away from an ink jet method at Col. 1, lines 35-45, particularly lines 44-45. Ito also does not teach a compound of the formula (I). Moreover, Ito is not an analogous prior art.

The Office Action alleged that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Shibahara with the disclosure of Ishizuka '548 in order to create a more stable ink for printing. Further, the Office Action alleged that it would have been obvious to ordinary skilled in the art to modify the invention of Shibahara with the disclosure of Ishizuka in order to make a more stable ink for printing. However, as discussed above in more detail, Shibahara is not a proper prior art as it fails disclose any of elements recited in Claim 25 of the present application.

Therefore, it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 30 and 32 under 35 U.S.C. § 103(a)

Claims 30 and 32 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara and Ito in further view of Yabuki.

As discussed above, the Office Action has failed to establish prima facie case of obviousness of the claims based on Shibahara, Ito and Yabuki, as Shibahara, the primary reference, fails to teach any elements recited in Claim 25 of the present application, from which Claims 30 and 32 depend.

For at least this reason, the rejection is not sustainable. Furthermore, none of the references, single or in combinations, teach all of the elements of Claims 30 and 32.

Accordingly, it is respectfully requested that the rejection be withdrawn.

Response under 37 C.F.R. § 1.111
USSN 10/765,929

Rejection of Claim 31 under 35 U.S.C. § 103(a)

Claim 31 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shibahara and Ito, and further in view of Ishizuka '294.

As discussed above, the Examiner arguably has failed to establish prima facie case of obviousness of the claims based on Shibahara, Ito and Ishizuka '294, as Shibahara the primary reference, fails to teach any elements recited in Claim 25 of the present application, from which Claim 31 depends.

For at least this reason, the rejection is not sustainable. Furthermore, none of the references, single or in combinations, teach all of the elements of Claim 31.

Accordingly, it is respectfully requested that the rejection be withdrawn.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Response under 37 C.F.R. § 1.111
USSN 10/765,929

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Sunhee Lee
Registration No. 53,892

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: May 1, 2007